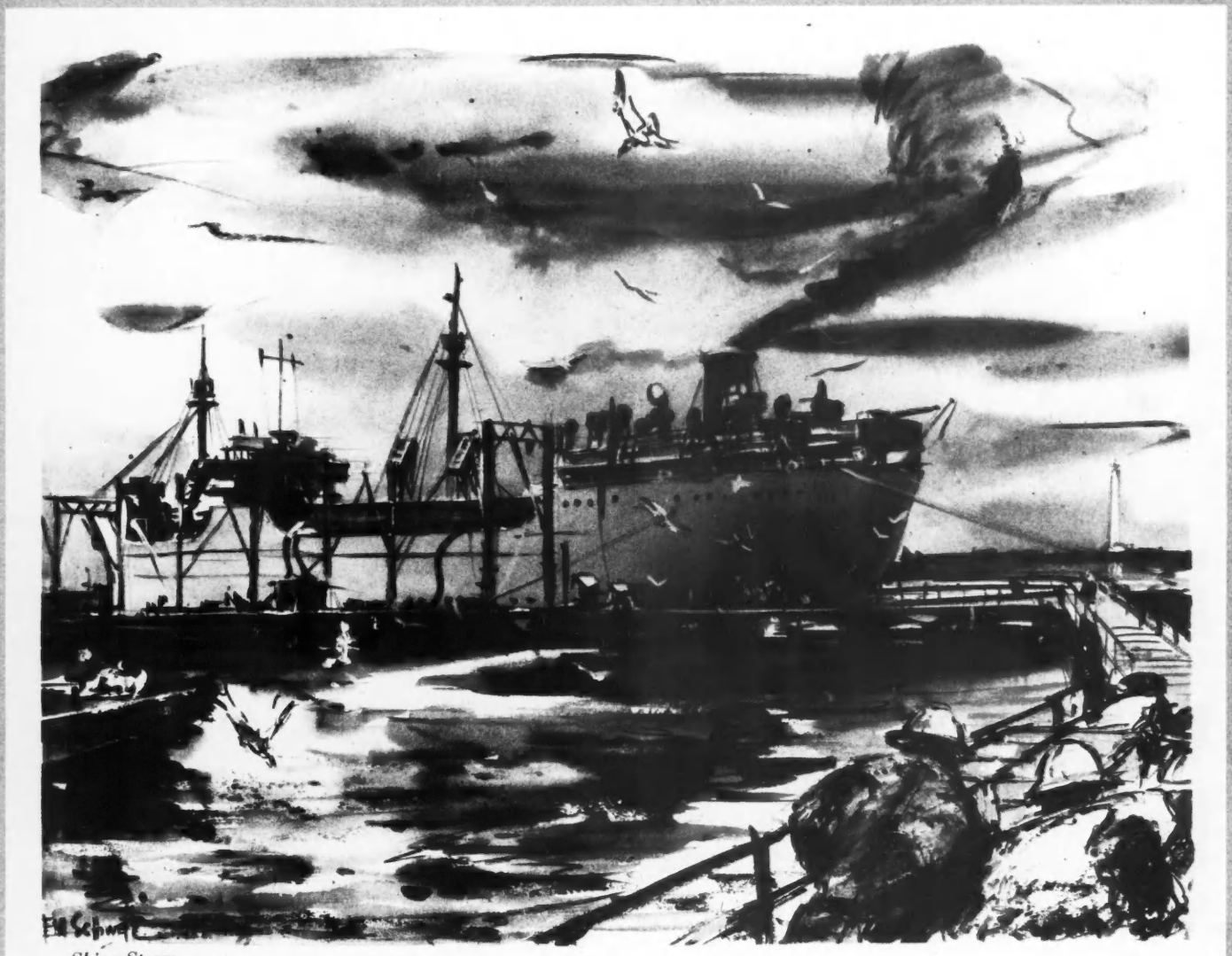
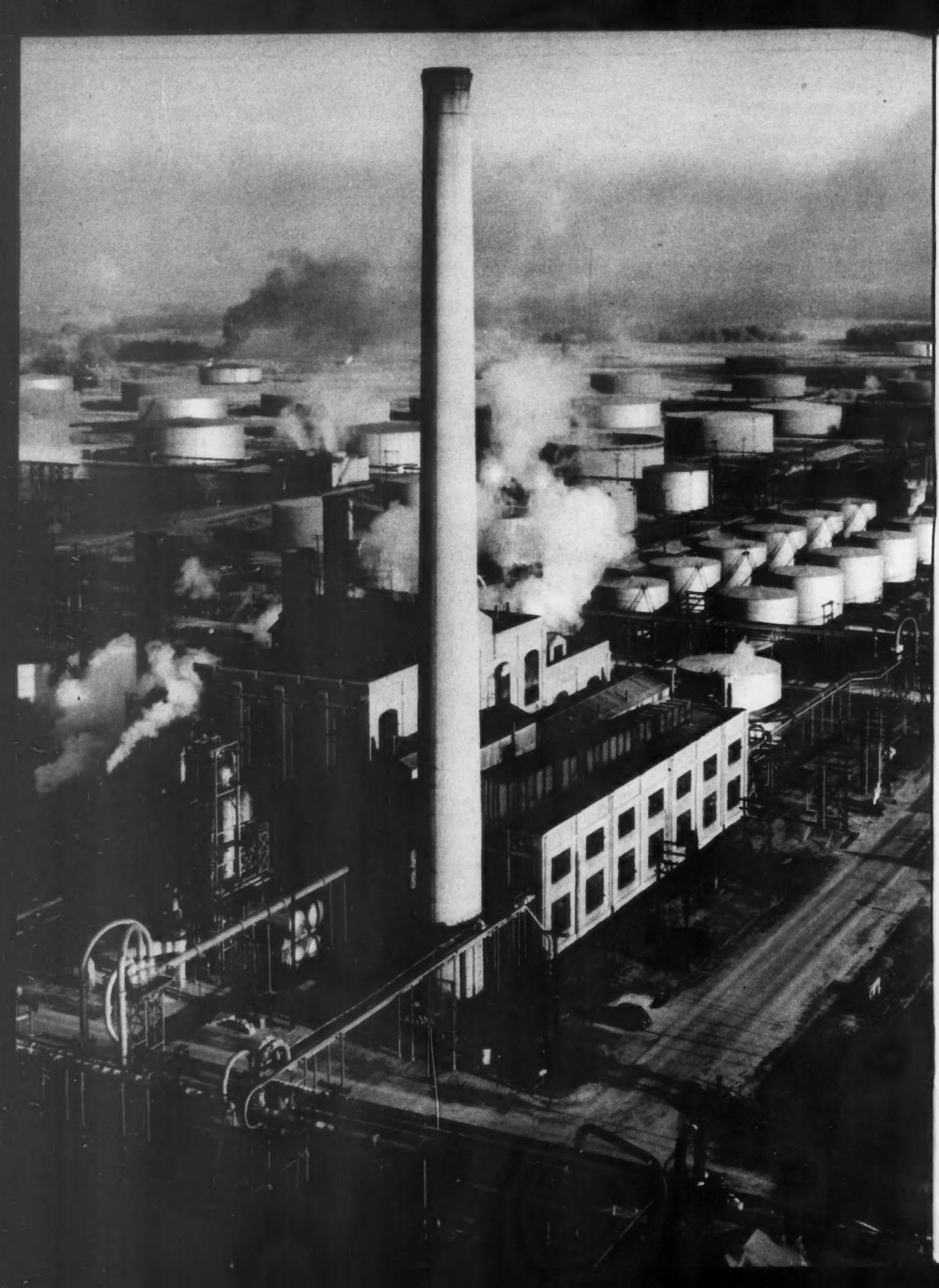


Ships Stores

The HUMBLE WAY

SEPTEMBER-OCTOBER, 1945



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The HUMBLE WAY

Vol. 1 SEPTEMBER-OCTOBER, 1945 No. 3

STARS IN OUR FLAG

AT war's end 3,764 Humble people had gone into the armed services of their country. The exodus, from desk and drilling rig, from crude still and pump house, had its beginning during the dark autumn of 1940 when the war was grim and America began to call up her young men to prepare for whatever might lie ahead. That tragic summer of 1940 had seen the fall of France, its armies crushed and its government in surrender. England stood alone against a powerful, ruthless Germany, arrogant with success, poised for what looked to all the world to be the knock-out blow. In this country, the Selective Service Act was passed in September and the slow, tortuous project of arming our republic got urgently under way.

The first sizeable group of Humble employees to enter the Service consisted of members of the Marine Reserve; they were called up on November 6, 1940. The following few weeks saw individual members of the Officers Reserve Corps leaving their Humble jobs for active duty; and then on November 25, 1940, Texas' great 36th Division of the National Guard was ordered mobilized and became a part of the Federal military establishment. Into the ranks of the 36th went scores of Humble men; from lowly buck privates in the infantry regiments to the lieutenant colonel commanding the division's aviation squadron, Humble employees took the places for which they had volunteered and had been trained. Salerno was only the name of a town in Italy when these boys marched off to Brownwood. The big camp that had been prepared for their training was named, with rare appropriateness, Bowie; after the man who, legend tells us, had his comrades carry the cot on which he lay ill across the line that Travis drew, so that James Bowie could be among those who chose to stay and die in the Alamo.

During the months that followed, there was a steady flow of young Humble men from their jobs to the training camps all over the country. It was still a peacetime army that was being built and "defense" was the word with which all our military preparations were described. But Pearl Harbor changed all that. Soon, what had been a movement of young men in relatively small numbers became a mass movement of hundreds; older men, men with families, men on jobs from which they could ill be spared, joined their younger fellows to swell the ranks of a fighting machine that was growing now, growing faster and stronger than America's enemies ever imagined it could grow.

Humble men were on the far-flung battle fronts during those heartbreaking early months. They distinguished themselves on Bataan; they suffered the unspeakable tortures of the "death march" and of the Jap prison camps; they died in the Aleutians. They flew combat off Guadalcanal when returning pilots couldn't be sure whether their comrades or the enemy held the air strip. One was a Doolittle man who dropped the first bombs on Tokyo. They toiled mightily with the service troops as great bases were set up half a world away, so that one day the full weight of our arms could fall on those who had attacked us and driven us back almost on our own shores.

When the great army began to move toward Europe to concentrate on bringing that war to a victorious close, Humble men were in the van. They flew the heavy bombers which daily roared out of British skies to carry out their high strategic mission against German industry; and they flew the fighter planes which protected the big fellows. They helped to man the ships of the Navy which shepherded the sprawling convoys through the submarine wolfpacks. They landed in North Africa and there they fought with gallantry and courage; and there they were captured and knew the hardships of German prison camps. And there they died.

As the war moved on, they fought on every battle front, carried out every type of duty assigned them. They performed spectacular feats which earned high military honors and they carried on the routine jobs that filled the days and nights of a soldier. They laid pipe lines that delivered gasoline to front-line tanks and planes; they operated those pipe lines; and they did it so well that those who knew about it marvelled. They flew the "hump" with men and materiel for embattled China; they slogged through Burma jungles.

There were Humble men on the beaches of Normandy and in the break-through at Saint Lo; they rode with Patton on his breath-taking swing that swept around the right and set France free. They stood and fought around Bastogne when the Battle of the Bulge struck terror to the hearts of those at home, lest the Germans break through again and reach the sea. They served on Admiral Nimitz's staff and with the armed guards on merchant ships which carried the cargoes of war. They were in New Guinea and at Leyte, at Iwo Jima and Okinawa; and they were at most of the already half-forgotten islands which marked the long road to Tokyo. One dropped the second Atom bomb which wrote "the end."

In Humble's service flag there are 3,764 stars; 57 of them are gold. Plain white crosses mark the graves of those who died on battlefields; the ocean is the resting place of the heroes who perished in her depths. Theirs was the ultimate sacrifice and theirs is the profound respect and humble gratitude of their fellows.

And now those who fought and lived are coming back; by October 1, nearly 500 former employees had returned. In addition, there are approximately 750 service men now with the Company who were not employees prior to the war. In the succeeding months they will be returning at an accelerated rate. In every department of the Company's operations, they are being welcomed. Humble people look forward eagerly to the time when all those who went away to war have come back home, so that side by side they may work to build a better, happier world.

MAIN POWER PLANT at Baytown refinery, one of six where steam and electrical power are created for refinery units.

WILDCAT AT NIGHT. This is one of some 120 wildcats scheduled to be drilled by Humble before the end of the year in various sections of the seven states in which the company is operating.

Looking for

TOMORROW'S OIL

Company's expanded exploration and drilling program aimed at replacing heavy wartime withdrawals and at building future reserves

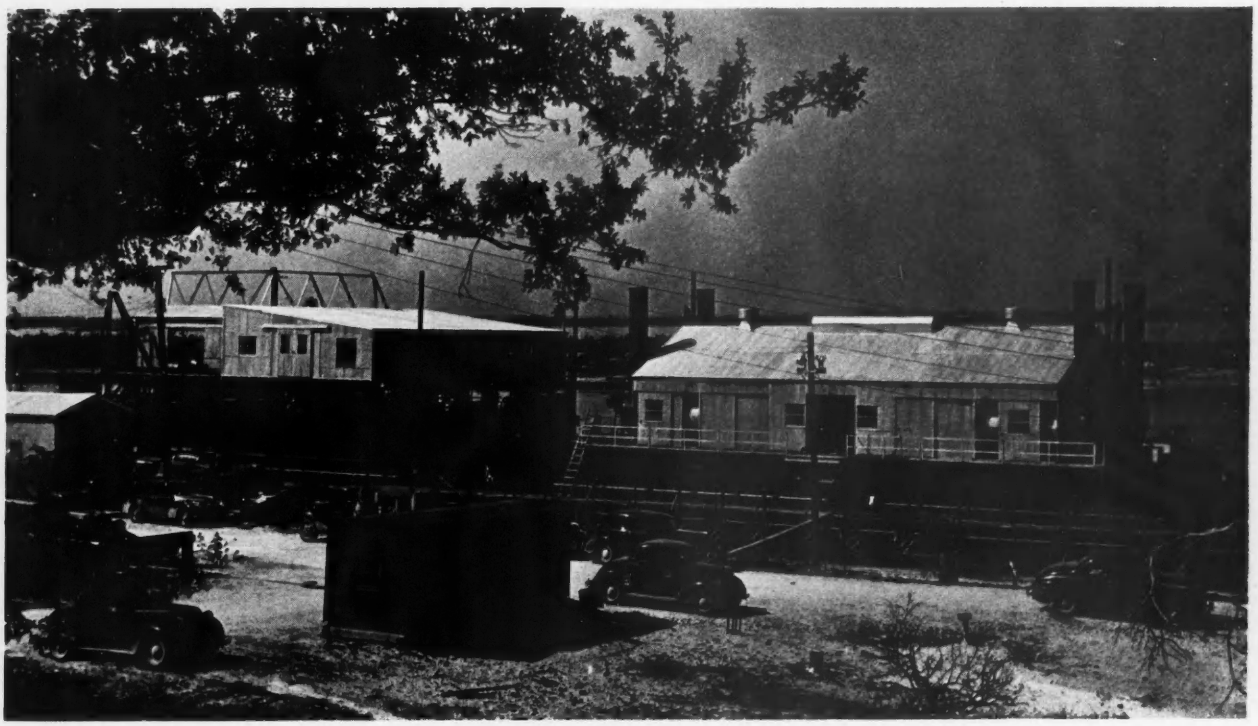
MR. JOHN CITIZEN, not immediately concerned with the question of where his oil needs of tomorrow will come from, probably considers a producing oil well today of substantially greater value than a dozen wildcat locations on a geologist's map. But the petroleum engineer takes a more realistic, long-range view. He knows that today's producer may be a dead well or only a stripper tomorrow; he knows that the 12 wildcats must be drilled because it is the one or two probable producers out of the 12 that mean tomorrow's new fields—reserves for the future.

Based on such long-range planning, the Humble Company currently is in the midst of a vigorous leasing, exploration, and drilling program aimed at the sound and systematic development of properties from which will come much of tomorrow's oil. It was the Company's discovery and development of reserves and its sound conservation program followed over many years which enabled it to supply more than one-fourth of the additional oil needed for war by this country from 1941 to V-J Day. The present program is designed to find and develop such reserves as the Company will need to supply its share in the reconversion period and in the following era of anticipated industrial development.

In addition to this long-range objective, there are two distinct factors motivating the expansion in exploration and drilling: Humble needs to replace unusual withdrawals from reserves made during the long period of heavy military consumption; Humble is greatly interested in having jobs available for returning veterans.

Accordingly, when the 1945 drilling program was outlined late in 1944 it was set at a comparatively high level, even though available manpower was not sufficient at that time to make the program entirely feasible. The return of veterans in growing numbers and the release of war industry workers in recent months is helping materially, and it is anticipated

COMPANY SUBMERGIBLE BARGE RIGS FOR SHALLOW WATER DRILLING ARE BUILT AT BARBOURS CUT NEAR HOUSTON



ONE REFRACTION CREW AND 11 REFLECTION CREWS ARE SHOOTING ACREAGE IN SPEEDED UP EXPLORATION PROGRAM

now that the full schedule of drilling may be completed by the end of the year and carried on into 1946.

Wildcat drilling, which reached a ten-year low in the industry during the early war years as a result of material and manpower shortages, was given considerable impetus late in 1942 when the Petroleum Administration for War urged the industry to drill more exploratory wells. The Humble Company promptly began planning for an expanded wildcatting program which has since influenced its drilling schedule materially. From the low figures of 28 and 29 wildcats in 1941 and 1942, respectively, Humble has increased its exploratory tests to 96 in 1944 and to about 120 this year.

Still other factors influencing the increase in wildcat drilling, in the industry and in the Humble Company, are improved equipment and improved methods of handling drilling problems. A decade ago heaving shale and equipment limitations caused the abandonment of many wildcat wells at depths which currently are being exceeded by several thousand feet. Attempting test wells to depths of 11,000 or 12,000 feet then was considered economically unsound, but today's improved equipment and improved drilling fluids make exploration to such depths possible and practicable.

Humble's current increase in wildcat drilling requires expansion of all operations of the Geologic, Lease & Scouting department. It calls for more geophysical exploration; it calls for additional geological work in finding structures and in supervising wildcat wells; it calls for more land and lease work such as assembling blocks of leases, pooling acreage, curing titles, and working out various types of contracts. All of these functions have been expanded, although the volume of leasing probably shows the greatest increase of all.

Humble has acquired acreage at an unprecedented rate in recent years. From a total of 3,549,000 acres under lease in 1928 the figure has increased to somewhere in the neighborhood of 17,000,000 at this time. By the end of 1946, it is anticipated, that another 1,000,000 acres will have been added. Much of the leasing has been in Southeastern states, an area into which the Company extended its operations only in the past few years. At the end of 1944 Humble had more acreage under lease in this area alone than it had altogether in 1938; acreage under lease in the state of Florida today is greater than the total acreage held by the Company 12 years ago.

Such gains in lease acreage mean a growing demand for geophysical exploration. From 1936 until early in 1943 eight reflection seismograph crews carried on all of the Company's work. Late in 1943 two crews were added, and today there are 11 reflection crews and one refraction crew shooting acreage in most of the seven states where the Company operates—an increase of 50 per cent in exploration work over early 1943.

Evidence that these crews are operating successfully is found in the fact that Humble's rate of discovery wells in 1944 was in the neighborhood of 20 per cent, while the industry-wide experience was about 13 per cent. Preliminary figures on this year's experience appear highly satisfactory, indicating a strong probability that 1945 discoveries at least will replace the year's withdrawals.

But replacing withdrawals alone is not enough; reserves must be built up for tomorrow. In the case of both, the cost of finding new oil is increasing rapidly. There are two reasons for this: wells are being drilled deeper, and the ratio of wildcat wells to proven area wells is up sharply.

For example, Humble wildcat wells in 1940 averaged 7,480 feet in depth; for the first half of this year they averaged 8,007 feet. Five years ago Humble field wells averaged 5,437 feet; this year they averaged 6,783 feet during the first six months.

Comparative annual drilling costs show the sharp upward trend. The cost of drilling 626 wells in 1940 was less than 17 million dollars; this year's schedule of approximately the same number of wells calls for an expenditure of around 56 million dollars. The average cost of all wells drilled in 1944, including dry holes, was $78,000, and it is anticipated that the per well cost for 1945 will be considerably higher. To a considerable extent this marked increase is due to the fact that the ratio of wildcats to field wells this year is much higher, being one to four as compared with one to 13 in 1940.

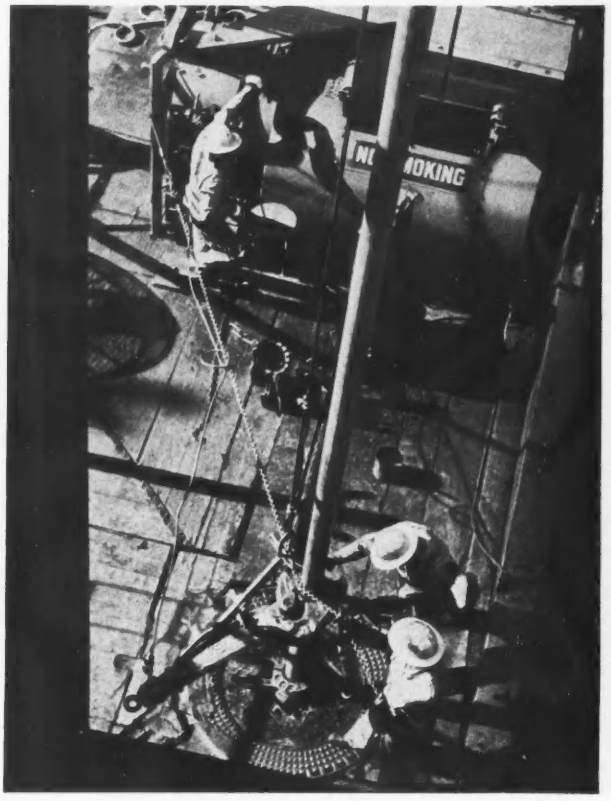
Reasons for wildcat wells being more expensive than proven field wells are numerous, but some of the principal ones are: approximately 75 per cent more drilling time is required because of the limited knowledge of drilling conditions; more time is spent in coring and logging; more time goes into the repair of rigs and equipment; transportation, mud treating and completing time are considerably more expensive.

Incident to the overall increased cost is the research and experimental work being conducted by the Production engineering division with a view to improving equipment and methods. Accommodating drilling rigs to all types of locations and all types of drilling is a tremendous task in view of the fact that such drilling units must be sufficiently portable to be readily moved from location to location and still be able to generate 1,000-1,500 horsepower of energy and hoist loads up to 600,000 pounds.

Careful comparative studies are being made of steam powered, diesel-electric powered, and internal-combustion-engine powered rigs. Individual units of the drilling rig assemblies are being tested and studied so that the work of the driller and his crew may be made easier and safer. Automatic equipment is being sought to replace manual equipment wherever practicable to make work easier as heavier equipment is added. For example, air-operated slips, which eliminate much heavy lifting, have been installed on some rigs. While this mechanical slip is not a Humble invention, the Company was among the first to try it and today has more in operation than any other company. Air brakes for the driller and other labor saving devices are also being studied—all with a view to making the entire rig safer, cleaner, and quieter place for employees to work. Drilling fluids, drill pipe, and fluid circulation are other phases of drilling operations being studied to bring about greater efficiency and to increase the ability to drill to depths not heretofore explored widely.

While the research and experimental work goes on in various sections of the Company's operating territory, 138 rigs currently are drilling from New Mexico to Florida. Of this number six are submergible barge rigs designed for deep well drilling in the shallow bays along the Gulf Coast, in lakes, and in coastal swamps inaccessible to wheeled vehicles. These barge rigs are large, expensive units. Derrick and drilling equipment are mounted on two parallel 120 x 24-foot barges, and the boilers and power generating equipment are housed on a third barge approximately 100 x 30 feet. The two units are towed to well locations in shallow water and are submerged to form a solid drilling foundation on the floor of the body of water. In bays and lakes they are towed to the well location and submerged; in the swamplands of Louisiana it is usually necessary first to dredge a canal to the new location sufficiently deep to accommodate the loaded barges.

While the water rigs are working principally in the coastal region of Louisiana, land rigs are more or less evenly distributed throughout the Company's operating area. Field wells and wildcats are being drilled in every division, with a little higher percentage of wildcats in New Mexico, North Texas, and the Gulf Coast region than in other sectors. But regardless of whether the well is a deep exploratory test, grinding away slowly at the hard formations underlying the sand hills of New Mexico, or a medium depth Gulf Coast field well, pushed down to pay dirt in a matter of days, the object is the same—to build reserves, to find tomorrow's oil.



VARIOUS UNITS of drilling rig assemblies are being tested and studied and wherever practical, automatic equipment is being sought to replace manual equipment with a view to making work of driller and crew easier and safer. Other phases of drilling operations are being studied to bring about greater efficiency and to increase the ability to drill to depths not heretofore widely explored.

EXPANDED DRILLING operations call for more geological work, both in finding structures and in supervising wildcat wells. Geologist shown on the derrick floor is studying core samples taken from this well.

Product HORIZONS

Superior civilian products, resulting from wartime research and manufacturing advances, flow from quickly reconverted refineries

By DR. H. D. WILDE
Manager of Research and Development

DOWN through the years of America's development from a land of vast, untraveled distances to a nation on wheels, the race for faster, more economical, and more convenient methods of transportation has been an exciting one. And this race, since the invention of the internal combustion engine, has become a two-sided affair with the manufacturers of engines striving to derive every ounce of power from the fuels made available to them and the petroleum refiners, through continuous research, evolving new and better fuels.

During the war period, this healthy competition between engine makers and fuel manufacturers was laid aside for the bigger job of supplying proved automotive equipment in tremendous quantities and literally oceans of high-powered gasolines. For some years now, automotive manufacturers have had no opportunity to put into production the improvements which normally would have occurred during this period, whereas fuel manufacturers, urged on by the demand for high octane gasolines for aircraft engines, have learned to make motor gasolines more powerful than was believed possible as late as 1941.

Because of the very nature of their manufacturing operations, it will take some time for the automobile manufacturers to convert to peacetime production and it will take still longer for them to incorporate into the design of their cars drastic innovations. The oil industry, on the other hand, just as it converted rapidly from peace to war, has been able to reconvert to the manufacture of peacetime products with little delay. A few short weeks after V-J Day, Humble was able to place on the market a new, premium automotive fuel with a research octane number of 95, the most powerful motor gasoline ever sold.

Such a product not only gave new life to the old cars on the road, but set a goal for fuel excellence toward which engine designers must strive. While this process of catching up is occurring, petroleum research will carry forward the lessons learned in wartime and will proceed with the conversion of other petroleum war products to civilian use.

One of the projects to which much attention is being given is the development and production of higher quality lubricating oils to keep pace with the upward trend in fuel quality. The store of technical knowledge acquired through years of producing quality lubricating oils has been augmented by information derived from the solution of wartime problems. Of special importance, is the development of certain additives, each specifically designed to improve a characteristic of the lubricating oil.

One such additive lowers the "pour point" of a lubricating oil, allowing it to flow readily at low temperatures. This prewar development was perfected during wartime and proved extremely valuable in the lubrication of aircraft engines at high altitudes. In automotive engines it allows instantaneous circulation of the oil in cold motors, thereby contributing materially to better operation, especially during the winter.

Other types of additives which are likely to create much comment and discussion in the future, are the "detergent-dispersive" group. These detergents when added to a lubricating oil actually clean the engine as they lubricate. Varnishes and sludges formed in the engine are washed down into the oil, so although the motor is kept clean, the oil presents a dirty appearance.

REFINERY RECONVERSION CAME QUICKLY AFTER PEACE TO USHER IN A NEW ERA OF CIVILIAN PRODUCT QUALITY

The use of lubricating oils containing detergent additives will cause a reversal of thinking on the method of determining when crank case oil requires changing. Formerly, an oil was judged by the way it looked after the car had been driven 500 to 1,000 miles. If the oil was clean and clear, it was thought that draining was unnecessary and in some cases, of course, this was true. In other cases, however, it was misleading. The tremendous heat generated inside high compression engines was capable of breaking down an oil and while the oil itself was clear, it had lost many of its lubricating properties. Varnishes and sludges were being formed within the engine and although they did not show in the oil, they were there, nevertheless.

In pre-war days, trucks, busses, and other vehicles in heavy service were subject to this unusual sludge formation. Tractors powered by high-speed diesels were also grave offenders. Heavy-duty motor oil incorporating a detergent additive was introduced by Humble and immediately proved its value by increasing the operating efficiency of engines in heavy service. During the war, great quantities of this oil went to the armed forces for use in the tractors and bulldozers which served so magnificently on all fighting fronts.

Other additives, upon which much research work is now being conducted, are called "film strength" additives. Experiments seem to indicate that a small percentage of these additives serve to increase the film strength of a lubricating oil tremendously. Other additives to improve various characteristics of the lubricating oils of the future are in pre-laboratory stages, indicating the accelerated use of these products as the automotive industry builds smaller, high-speed engines which will present greater problems of heat and pressure.

Petroleum research also has been at work on the subject of grease type lubricants. Long before the war, mass production methods for the manufacture of grease lubricants had been evolved which completely dissipated the old notion that grease making was an art that could be practiced only on a small scale. Mass production of greases under strict, scientific control made possible the supplying of great quantities of such products required by the war effort. New products were developed, new methods perfected, and tons of special greases shipped to the battle fronts for use in war machines.

Modern greases, like lubricating oils, require additives to impart certain desired lubricating properties and qualities. One family of additives, known as the "extreme pressure"

group, resists the sliding and rolling pressures found in such assemblies as hypoid rear axles. Double action pressure in such assemblies tends to wipe off ordinary greases, resulting in metal to metal contacts.

Sulphur is one of the extreme pressure additives most widely used. Under heat, sulphur is transformed into a metal sulphide which produces a slippery film between moving metal surfaces. Lead-based soaps also perform a similar function by depositing a thin lead film on the moving parts. Under extreme pressure, when the grease may be squeezed out, the metal film stays to prevent surface contact.

Chlorin is still another extreme pressure additive which under heat and pressure produces metal chloride which acts as a non-welding film between the moving surfaces.

Through the use of proper additives and special compounds, greases were developed during the war which would allow airplanes to take off in desert heat of 120 degrees, and after a fast climb, to operate in sub-zero temperatures. This new knowledge in grease lubricants will now be converted to the production of similar products for civilian use in automobiles.

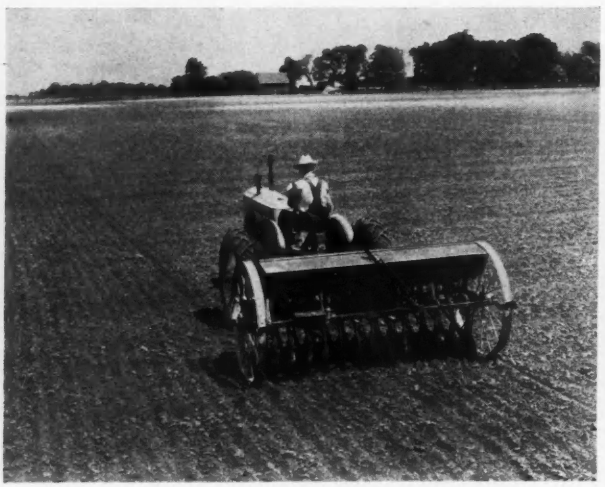
Industry will profit from the lessons learned by the petroleum industry in the manufacture of many special petroleum products for war use. In the field of cutting fluids for machining metals, great progress has been made in the development of high load-carrying, transparent oils which established new records for precision, speed, and cleanliness in war plants. These new cutting fluids will be further developed to meet the peacetime needs of industry as it reconverts to the production of civilian goods.

Petroleum base rust preventives used in great quantities to protect war machines in transit from the manufacturers to the battle fronts, will protect idle machines during the reconversion period and will be the basis for new techniques in packing, shipping, and protecting the goods of America as they move domestically and internationally into the hands of the consumers. During the war, researchers have been busy solving the corrosion problem of this age of steel, and newer, better, and more permanent protective coatings will soon be available.

Aviation products, of course, reached an unusual state of perfection during the war and it is not to be expected that much more development will be forthcoming on these products in the near future. But the private and commercial flyer

WITHIN A FEW short weeks after V-J Day Humble was able to place on the market motor fuels of higher quality than had ever been avail-

FACTORIES AND FARMS will benefit much from the wartime improvements made in fuels, lubricants and specialty petroleum products.



able. Lessons learned during the war are being applied also to other products, promising early introduction of new types of lubricants.

ON SKYWAYS AND HIGHWAYS the products born of wartime research serve today and are being improved for tomorrow.

of today has available to him quality aviation products on a par with those which helped us win air supremacy.

One of the outstanding developments of the war is the gas turbine which can be used either as a source of power or in connection with jet propulsion. The principles on which the gas turbine is based have been known for a long time, but the practical application has had to await the development of new metallic alloys that can withstand the terrific temperatures involved. The gas turbine is the newest, simplest, and most efficient prime mover yet devised.

A great deal of interest has been expressed as to the effect that widespread use of the gas turbine would have on the oil industry's future. The type of fuel required is quite different from that now furnished for gasoline engines. High octane is of no advantage; in fact, the ideal fuel would have a very low octane rating. Furthermore, a heavier, higher boiling product than gasoline can easily be used; high grade kerosene appears excellently suited for the purpose. However, since supplies of high grade kerosene are limited and are now required for illuminating and heating purposes, the installation of new refining equipment would be necessary to supply substantial quantities of gas turbine fuels.

Since a gas turbine has only a few moving parts (in some models only one or two) and these are rotating rather than reciprocating, it might appear that the lubrication problem would be simple. On the other hand, the high speeds at which the turbine operates and the difficulty of designing it without exposing the bearings to unusually high temperatures complicates the problem. It is essential to provide a lubricant that will maintain its lubricating properties when the shaft is rotating at high speeds and which will not break down and deteriorate under the high temperatures to which it is exposed. Lubricants that serve satisfactorily are now available, and as the use of gas turbines grows we can expect to see improvements in lubricants that will meet the requirements encountered in gas turbine operation.

There is every reason to predict that future quality trends for fuels and lubricants will continue upward. As better engines are developed and produced, correspondingly better petroleum products will be ready to power and lubricate them. Better manufacturing methods, new processes, and new additives will, in the years ahead, allow petroleum refiners to furnish materials to suit practically any purpose.

Rig Builders

Special skill and courage are required of seven-man crews which erect the strong, slender 136-foot derricks from ground to top in six days

FOUR DERRICKMEN SPOT FIRST LEG TO START UPWARD FROM SUBSTRUCTURE

FOR the man who is not sure of foot or who fears high places there is no room in the fraternity of rig builders. These steel hangers are members of a highly specialized profession, which from the early days of the oil industry has attracted only men with a brand of skill and courage especially suited for this type of work.

Rig building today is a far cry from what it was some 40 years ago when derricks were built of heavy timbers to heights ranging from 60 to 90 feet. Today's all-steel derricks are scientifically pre-fabricated structures, engineered for efficient and safe operation under loads up to 800,000 pounds. They must be erected according to an approved pattern, and most of those used in present day deep well drilling rear their heads 136 feet high.

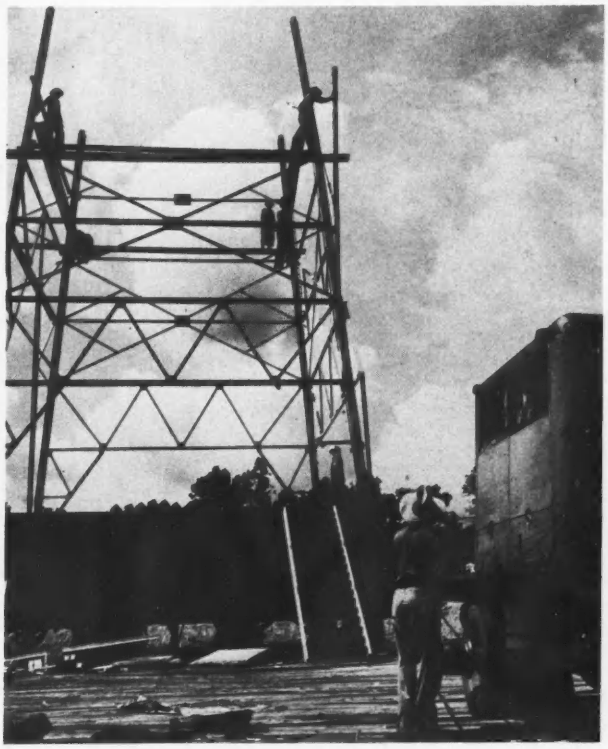
Although a great many Humble derricks are built by contractors, the Company maintains two crews of rig builders, one in the East Texas division and one in the Gulf Coast division. Contract crews generally are made up of six men, but Humble crews include seven — a foreman, a ground man, a floor man, and four derrickmen. The foreman operates the cathead, or power drive, which hoists structural steel up to the derrickmen; the floor man selects the girt, or leg, or brace that is needed above and hooks the hoist line on so that each piece may be handled easily by the derrickmen; the ground man assists the floor man in getting units of steel into position for hooking on and also digs anchor holes for the guy lines which go up later to brace the completed derrick. The four derrickmen are the men who do the trick footwork to place the steel into position, stab it, and bolt it securely. Each of them carries two spud wrenches and a supply of bolts of the proper length needed to fasten that portion of the structure on which he works. Long bolts are needed at the corners where heavy pieces of steel overlap; shorter bolts are used to secure the lighter braces that interlace.

The rig builders do not begin their work until all the preliminary work on a new well location has been completed.

DERRICK STEEL IS UNLOADED AND STACKED CAREFULLY

RIG BUILDERS BEGIN LAYING FOUR CORNER FOUNDATIONS

SETTING ANCHORS FOR GUY WIRES TO BRACE DERRICK



FOREMAN USES CATHEAD TO HOIST STEEL TO DERRICKMEN

This includes building roads, digging mud pits and rig foundation, and hauling in lumber and steel. The rig builders actually start by laying the foundation for the four corners of the substructure, a combination of heavy timbers over which is laid the steel base. This done, they start erecting substructure corners and then begin to move upward comparatively fast. Progress pictures on the following page indicate the rapid strides made in the course of an eight-hour day under favorable weather conditions.

How long does it take the rig builders to go up with a derrick? That depends, naturally, on the size of the derrick and prevailing weather conditions. A small 122-foot derrick with a 24-foot base and seven-foot substructure can be topped out in a matter of three days, including the construction of pipe and casing racks. The latter operation usually requires a full day on any type of modern rig. The larger 136-foot derrick with 26-foot base and seven-foot high substructure usually requires from three and one-half to four days, and

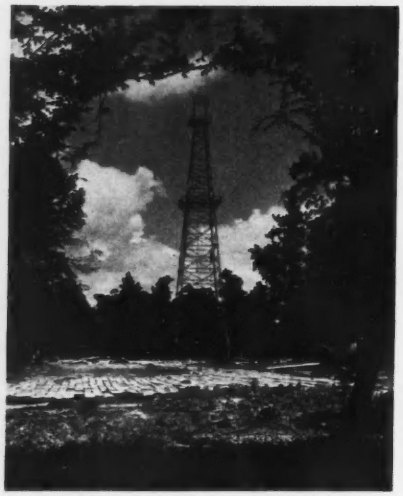
TUESDAY 2 PM—Most of Monday and Tuesday was spent on substructure and derrick floor.

WEDNESDAY 10:05 AM—Floor was completed and derrick pushed quickly to this point.

WEDNESDAY 3:30 PM — Progress was fast throughout the day. Weather was favorable.

FRIDAY 10:00 AM—Rain Thursday cut out a day's work, but rig moved upward Friday.

SATURDAY 3 PM—The "crow's nest" was in sight when bad weather again cut work short.



TUESDAY 4 PM—Rig was topped out, two days behind schedule because of bad weather.

the largest modern derrick for deep wells—136 feet high, 30-foot base, and 10-foot substructure — generally is topped out in six days.

To appreciate fully the speed and efficiency of the rig builders, consider the amount of steel that goes into the latter type of rig. Foundation steel weighs 26,500 pounds; substructure steel adds another 54,600 pounds; and the steel in the derrick itself weighs 64,500 pounds. That makes a total of 145,600 pounds, or approximately 73 tons, handled, placed into position, and made secure by the rig builders.

Weather conditions very frequently alter the completion schedule on a derrick. Rains, heavy fogs, electrical storms, or high winds make work up in steel skeletons unsafe and work is suspended when such conditions prevail.

In normal weather rig building seems rather prosaic during the erection of the first few girts, but when the structure rises to the half-way mark and above the movements of the derrickmen up in the web-like network of steel become dizzying to watch from the ground. A newcomer looking on would not consider theirs an enviable occupation, and yet it is all in a day's work to experienced rig builders. They seem to move about on the narrow steel girders and scaffold boards as easily and quickly as any other men working at other tasks on the ground. They even seem to be oblivious to the dangers. But they are careful. Indeed they are. Caution comes with experience, as does coolness and dexterity, and every member of the crew shown in the pictures made during the construction of a 136-foot wildcat rig near New Caney, Texas, has from 12 to 19 years of experience.

Safety is a very real thing with these men and their accident rate is evidence of that fact. Not since early in 1942 has a member of this crew suffered a disabling injury. Of course, there is an unwritten code among the crew members that if a derrickman does not feel up to working high up in the rig he can ask for a substitute. In that case the floor man, who is also a trained derrickman, takes his place and the indisposed derrickman or the ground man takes over the floor man's duties.

Patently, not many people would care to change places with the rig builders, and the rig builders say the feeling is mutual. They like rig building. They say so unhesitatingly, and they don't care for more commonplace down-on-the-ground work.

Ship's Stores

Providing quantities of food and variety of supplies needed by tankers on long voyages is a specialized, high-speed task

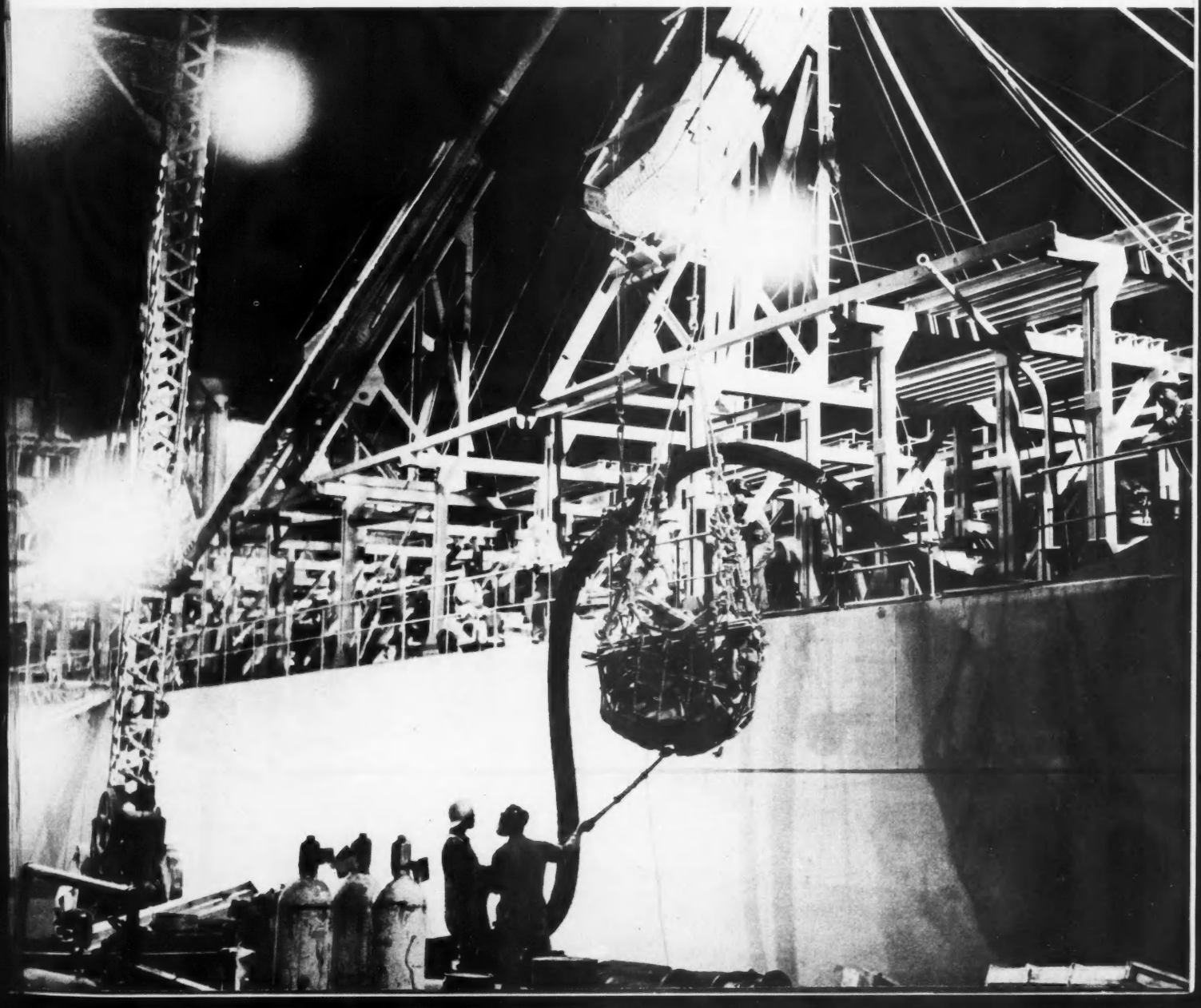
FROM the window of the Marine department's office in the dock area at Baytown refinery the recently commissioned 140,000-barrel tanker looked majestic in her new coat of gray paint. She fairly sparkled in the mid-morning sun as she was piloted up the channel. As she was being tied up at Dock 2 for her first cargo of petroleum products, destined for somewhere in war-torn Europe, she seemed to emblemize that vast armada of supply ships which made Allied victory possible in both theaters.

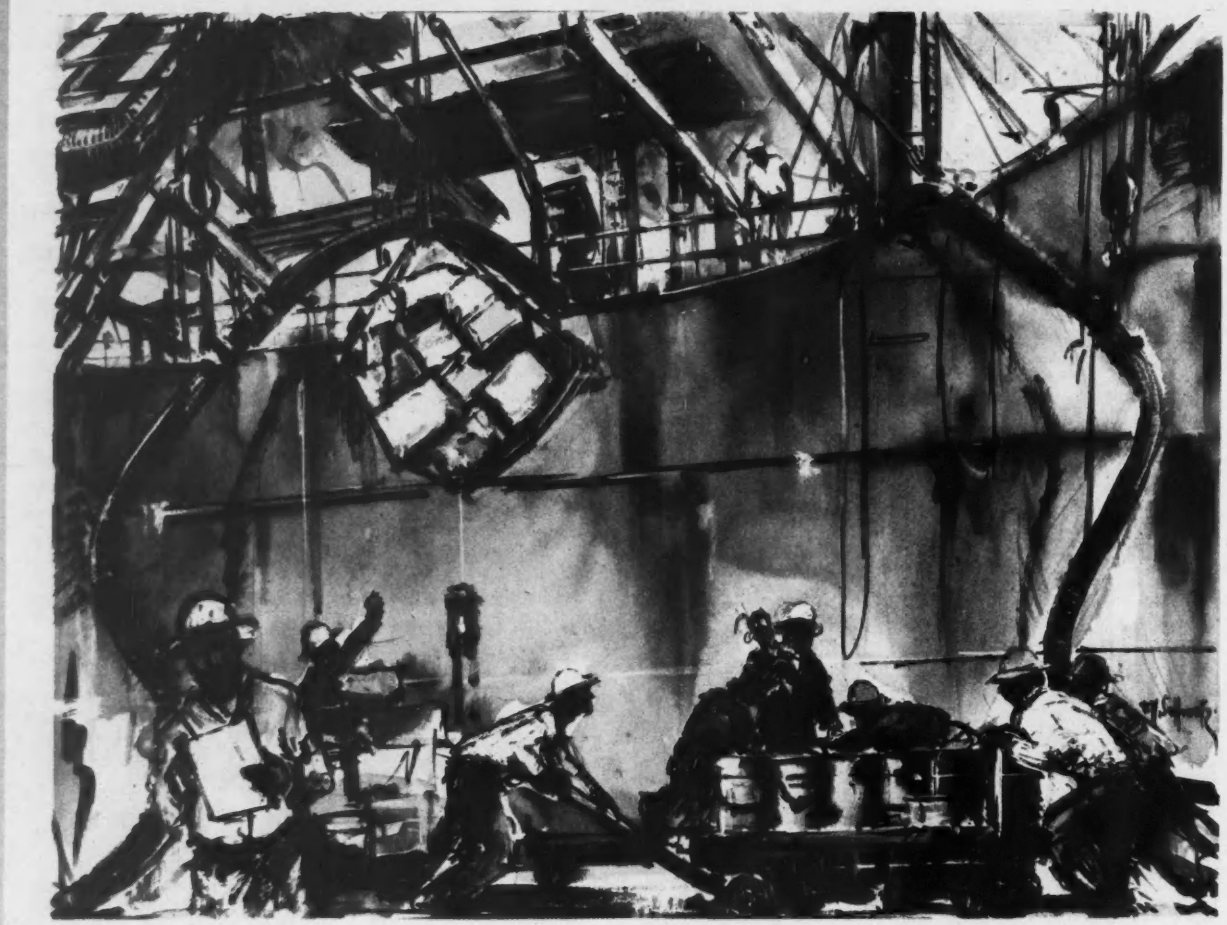
Along the after rail several officers watched while crew members lowered the gangplank. Seagulls hovered about her; occasionally one dive-bombed for a morsel of food.

In the Marine department office there was a fever of activity. Arrival time of supply trucks was verified by telephone; requisitions were checked and re-checked carefully to make certain that nothing had been overlooked; mail and maritime papers were bundled up to be delivered to the captain; final details were arranged with the U. S. Customs office.

At the head of the long ramp to the dock a sizeable crew

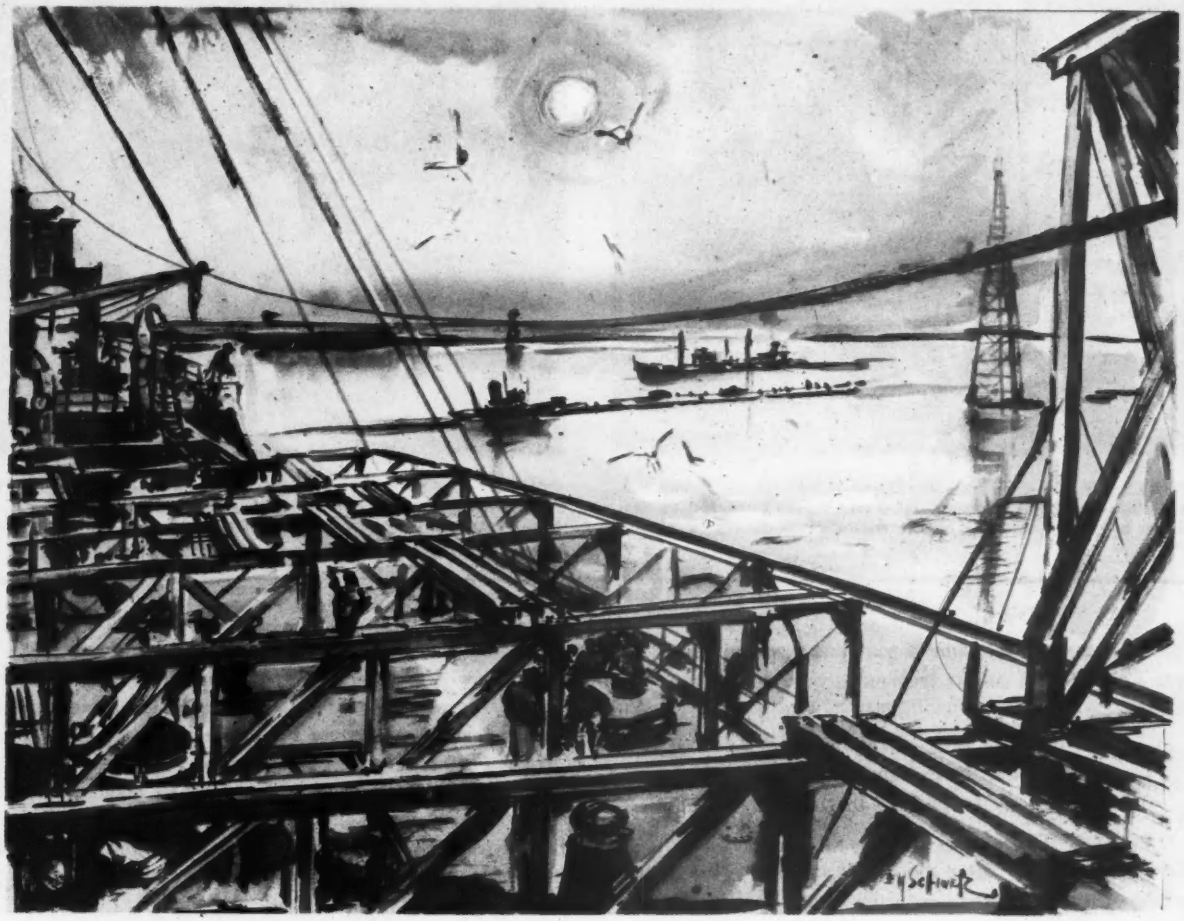
FAR INTO THE NIGHT STEVEDORES CONTINUED LOADING STORES UNDER THE GLARING DOCK AND DECK LIGHTS

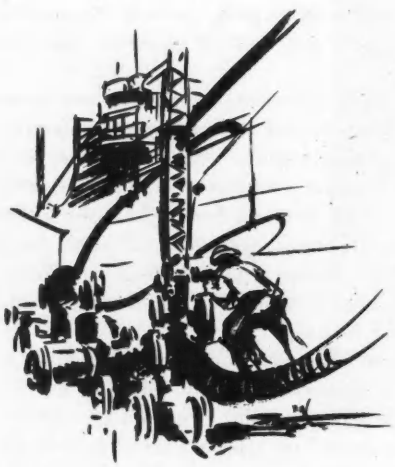




THE STEWARD

FIRST IMPRESSION of this sleek, new tanker, receiving for the first time her prosaic load of provisions and cargo, was of a queen, oblivious to her work-a-day and time worn surroundings. Riding high above the coastal horizon, she seemed to rule a little realm of straining men, crawling lines of hose, busy tugs and grinding machinery. This quiet but expectant serenity is typified by the gray tones which predominate, both strong and subtle grays emphasized by the busy color of the straining stevedores pushing their loads.

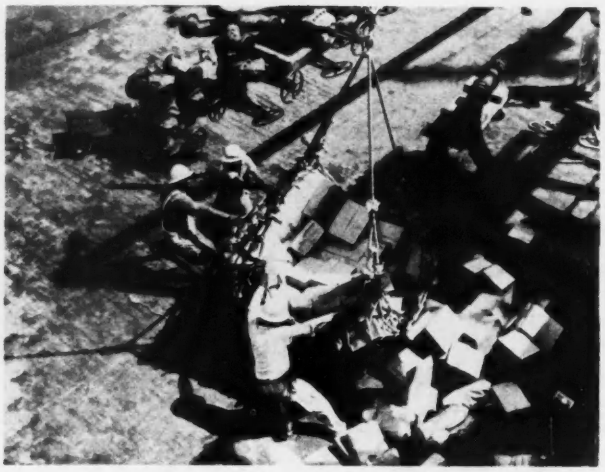




SHORTLY AFTER NOON, the sun, intense and vibrant, beat mercilessly down on this wilderness of steel. The surface of the deck became almost completely lost in the monochromatic maze of steel gray laced with shafts of light and blocks of shadow. Every now and then, scattered groups of bronzed, unshirted men added striking accents of color to the broad field of gray. And over it all hung the shimmering heat, direct and reflected, from a relentless southern sun. A hot yellow blanket that made everything quiver to its touch.

RAISING THE HOSE

A STAKE TRUCK came from the Baytown bulk agency about mid-afternoon with barrels of motor oil, kerosene, and other petroleum products needed on deck and in the engine room during the voyage.



ON THE DOCK husky stevedores sweated and strained as they secured a great variety of materials and supplies in cargo nets and slings and carefully guided them up over the ship's side.

of stevedores lounged in the warm sun, awaiting arrival of ship's stores. Ship's stores! It sounded interesting and at the same time confusing to a landlubber. It would all be cleared up in a short time, we were told; now there was just time to go aboard and meet the captain, the mate, the chief engineer, the steward and the purser—the men directly interested in ship's stores.

Less than an hour after the tanker had been tied up the first supply truck backed up to the ramp. Before we could get down to the ramp, stevedores had started loading dollies. To our surprise all that seemed to come out of the big van was paint—literally scores of five-gallon buckets of paint and varnish. But then after a number of loads of paint had been wheeled away there came rope, wire, cordage, hose, tools, ladders, and electrical supplies. The mate, who was busy on deck rigging the booms to begin taking cargo, had dispatched a crew member to check the materials against his requisition since these were deck supplies.

Meanwhile the steward paced about the ramp, looking anxiously toward the dock area gate. When the packing house truck came, the first truck still partially loaded was pulled away to make room. Here was fresh frozen meat; speed was essential to get it into the ship's cold storage. Quickly as possible it was unloaded and wheeled to shipside. Then the stevedores split into two sections—one group loading the packaged meat in cargo slings to be swung on board, the other group coming on deck to carry it into the chill box where the steward and chef checked it and directed its storage in the freezer.

Lunch with the captain and his officers was convincing evidence that the steward was an experienced buyer of sea rations and that the chef had the knack of selecting from his larder the items necessary to the preparation of tasty and substantial meals. In the officers' mess and in the crew's mess we were convinced that a rumor we had often heard was actually a fact: tankermen do eat heartily!

During the afternoon trucks continued to back up to the ramp and disgorge supplies—many items which scarcely seemed like the kind of material needed on a tanker. There were buckets, cement and reinforcing steel, boiler parts and packing gaskets, ice, soap powders, rubber boots, linens, navigation and precision instruments. In the late afternoon came a stake truck from the Company's Baytown bulk agency with barreled goods—motor oil, kerosene, and other oil products for the engine room and deck.

Far into the night loading continued. Fresh fruits and vegetables, milk, butter, and other dairy products and eggs made up one truck load. Then came another load of dry provisions—staple groceries, canned goods, and cigarettes. In the latter load was included the great variety of articles ordered by the purser for the "slop chest," or ship's post exchange. Work clothing and shoes, candy bars, chewing gum, bottled drinks, pipes, tobacco, playing cards, combs, hair oil, shaving cream, razor blades, magazines, and other items which crew members are likely to need while out at sea.

The process seemed endless—unloading from trucks to dollies, wheeling them to shipside, packing the supplies in cargo slings and nets, and hoisting them on deck for distribution.

It was particularly interesting to observe how systematically the stevedores loaded the variety of materials into cargo nets and slings. Cartons and boxes were carefully stacked to avoid crushing; odd-shaped supplies and materials were handled in such a way that they might easily be hoisted aboard. On deck the winch operator went about his work calmly, hoisting the loaded nets and slings up slowly and carefully and swinging them into position on deck to simplify the distribution of materials.

The need for the variety and quantity of materials gradually became more apparent. Especially after we had made a tour of the ship—bridge, galley, engine room, and crew's quarters. In all it added up after a Marine department representative told us that the crew consisted of some 50 men

ON DECK stevedores and members of the galley crew teamed up to rush frozen meats into the chill room. With other stores the stevedores were aided by other crew members familiar with storing of supplies.

IN THE GALLEY there was evidence all about that the chef and his crew had the knack of creating tasty and substantial meals—meals prepared on the theory that tankermen eat heartily.

and officers and that the tanker only recently commissioned had come into Baytown from a Gulf Coast yard with comparatively light supplies aboard and was completing 180 days of supplies for the deck, the engine room, and the cabin; 120 days of dry provisions (staple groceries); 90 days of meats and dairy products; 45 days of eggs, vegetables and fruits; and one year of lubricating oils.

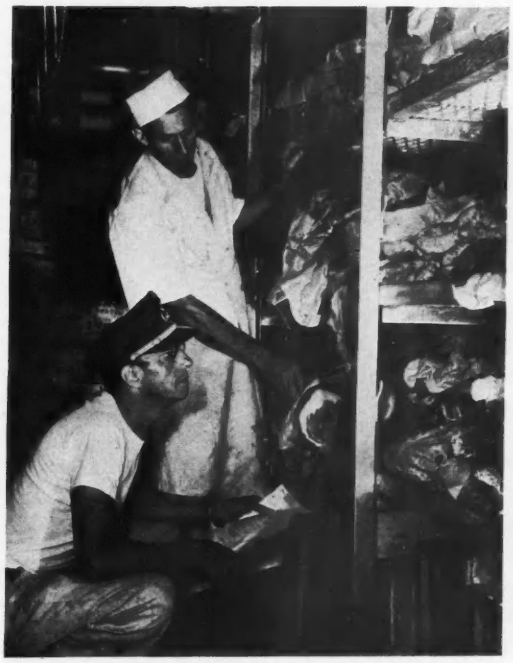
Who had decided how much of each of these items was needed and who had ordered all of these supplies? Requisitions had been prepared by four men on board ship, we learned: by the mate for deck supplies; by the chief engineer for engine room needs; by the steward for galley requirements; and by the purser for "slop chest" stocks.

More important still, we thought, was who had actually purchased these truckloads of supplies of all kinds and rushed them to the dock for loading so shortly after the ship's arrival. That is where the Company's Marine department had played its part.

In most cases the captain of the ship, who approves all requisitions, turns the entire order over to a Marine department representative as soon as the ship docks. Quite often a launch is sent out to meet the incoming ship while she is at quarantine in the Roads at Galveston, and the orders are rushed back to make possible immediate purchase and delivery of ship's stores. In this case the orders came in by mail while the ship was out on trial run, giving the Marine department more time than usual to provide stores.

However, no matter how the orders are received, work begins immediately on having them filled. The department's port steward buys by telephone from a dozen or more suppliers who deliver to Baytown and Texas City by truck. Since the hourly cost of keeping a big ship in port is relatively high, speed is essential, and because oil cargo can be loaded rapidly it is paramount that stores be rushed aboard by the time cargo is loaded so that the tanker may be dispatched.

As both jobs progressed far into the night, we stood on the ramp to watch the activity from a distance. Glaring lights on the dock and on deck flooded the tanker amidships, but the bow and stern faded into the night. There she lay, literally a floating community — self-contained, self-sufficient, carrying her own power plant, utility system, supply storage, and repair and maintenance shop, to say nothing of her vast cargo. To the crew she would be home, hospital, and recreation center for days on end.



STEWARD AND CHEF supervise storage and orderly arrangement of fresh and cured meats in the ship's chill room.

Once out on the high seas she could not turn back for something that had been forgotten; her captain or steward could not pick up the telephone and order out something that was needed. She had to have everything aboard — everything for the ship herself and for the crew.

That is why ship's stores are important; that is why extra care even at high speed is so essential in the purchase and delivery of supplies to a ship in port.

ON THIS 75-FOOT PANEL ARE 130 INSTRUMENTS WHICH CONTROL 13 COLUMNS OF LIGHT ENDS FRACTIONATING UNITS

GIANT Control

Precision instruments, interpreted by trained operators and kept in repair by skilled technicians, make possible finger-tip control of modern refinery units

ACCURATE automatic process control in modern refinery units depends on precision instruments; these instruments depend on one group of skilled process operators to interpret them and on still another group of highly trained technicians to keep them in good order.

World War II, with its emphasis on high octane fuels and special cuts or fractions for use in the manufacture of toluene, synthetic rubber, and other synthesized war products, gave tremendous impetus to refining technology. Because the exigencies of global warfare demanded petroleum products of much higher quality and in much greater quantity than any prewar planners dared dream, catalytic cracking, superfractionation, hydrogenation, and other new processes were catapulted years ahead of schedule.

Virtually all of the developments in refining methods and processes born of wartime emergency brought mushrooming demands for expansion and improvement of instrumentation. More instruments were needed to control the operation of giant units which dominate refinery skylines, and more trained men were needed to insure proper performance of instruments measuring and controlling flow, temperature, pressure, liquid level, and other phases of instrumentation. At some units a variation in temperature of as much as one-fourth of a degree will affect daily output by hundreds of barrels. This, obviously, is no job for human hands.

The recent abrupt change from war to

peace brought little respite for units producing high octane gasolines and other quality products. With the lifting of rationing restrictions, reconversion was begun immediately and within a few short weeks after V-J Day motor fuels far better than any on the prewar market were being supplied for civilian consumption.

Since the quantity and quality of products flowing from these complicated units depend on the accuracy of control instruments, highly skilled specialists, responsible for the maintenance and operation of instruments, are assigned to each unit at Humble's Baytown refinery. Repairs and adjustments are made on the spot, whenever possible. From time to time, however, it becomes necessary to send instruments to a central repair shop, where they are cleaned, inspected, repaired, and calibrated, or verified for accuracy. It was to this shop that we went first in search of a story.

As we entered the shop, a half dozen men, using chain hoists, were placing safety valves on two large testing racks. These valves, sometimes called relief valves, are spring-set to open and release pressure ranging from a few ounces to well over two thousand pounds per square inch. Before operating pressures become dangerously high, these valves open and release the pressure. To protect men and equipment, great care must be taken in the shop to obtain the correct spring setting. Safety valve failure can cause disastrous explosions and fires.

Across the shop from the safety valve racks busy lathes in the machine room were grinding and cutting bars and strips of metal into instrument parts. Sometimes, when the warehouse is temporarily out of parts for an emergency job, machine operators are called on to fashion these parts.

Just outside the machine room was a section for control valves, or diaphragm valves. These are placed in piping layouts and are operated automatically to control just the right amount of flow through those pipes.

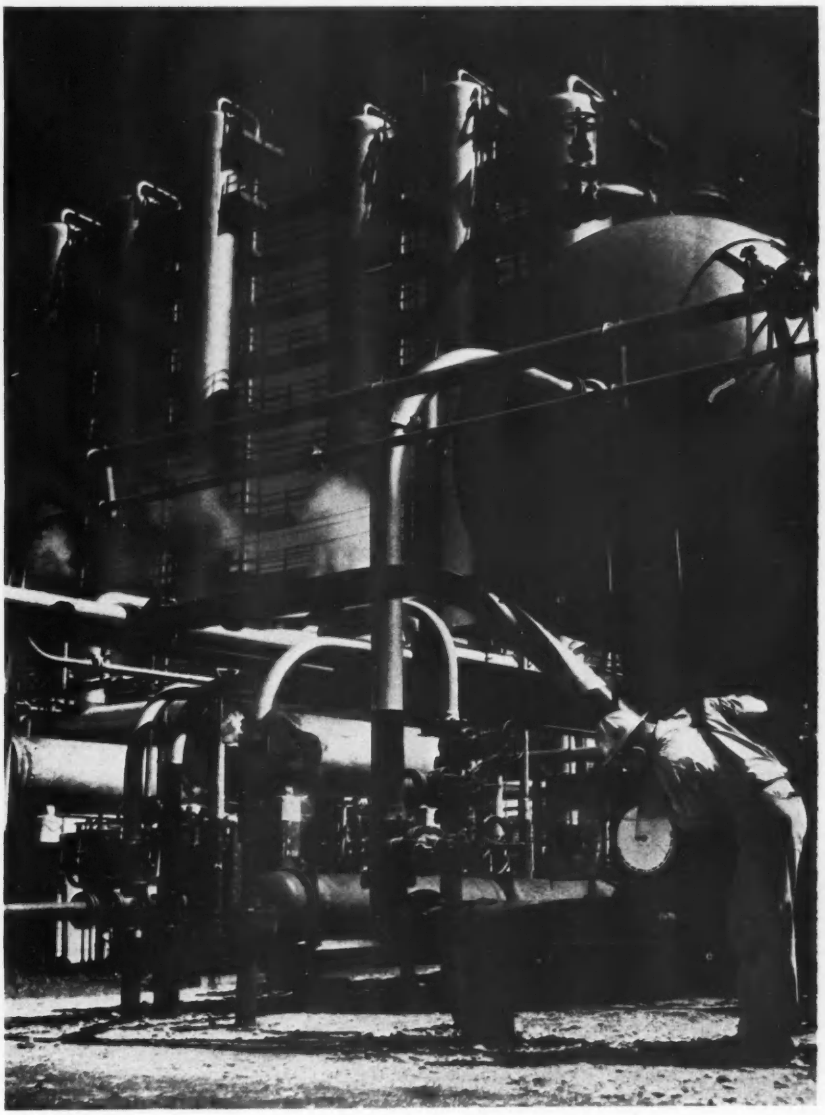
In the gauge room, repairmen were working on pressure gauges sent in for tests, repairs, and replacements. Most of these gauges were the circular face type. An indicating pointer which moves clockwise across the dial indicates pressure in pounds per square inch. From a standpoint of numbers, pressure gauges are the most widely used instruments in the refinery, several thousand of them being placed on pumps, lines, vessels, and elsewhere in the field. The shop repairs an average of 1,500 such gauges every month.

Back in the flow meter department, recorders and controllers were being cleaned and calibrated, or checked for accuracy against a pressure system. The repairman in charge explained, as simply as he could, how these instruments made it possible for process operators to control a complete refinery unit from a centralized control room. By raising or lowering a set pen on the instrument chart, flow through a pipe can be controlled hundreds of feet away, he explained. Temperature, pressure, and liquid level in vessels are controlled similarly. We were to get more information and a demonstration on process control later.

Just to the left of the flow meter department was the room where pyrometers and other electrical and electronic instruments were being repaired. Pyrometers are highly complicated instruments which receive small charges of electricity from their primary measuring element, known as a thermocouple. These charges in millivolts, or thousandths of a volt, are translated on the pyrometer scale or chart into degrees Fahrenheit.

Rounding out the work of the shop was a small clock room, where the hun-

INSTRUMENT TECHNICIAN adjusts recording pen on a flow meter which measures flow of oil through horizontal pipe to which it is attached and to the giant unit in the background.



dreds of clocks used in the refinery are checked and repaired.

Instrument department personnel often design and build special instruments for specific jobs. Just before the Catalyst Light Ends Units were completed, it became apparent that operation would be held up for several weeks, pending shipment of factory made level controllers. These controllers were built in record time in the Baytown shop, and precious weeks were saved.

An instrument measuring specific gravity of certain oil mixtures was another product of shop effort and ingenuity. The invention of many special handling tools and other handy gadgets saving time and money has given instrument men a high ratio of Coin-Your-Idea awards.

Emphasis throughout the shop was on safety. Signs and placards posted here and there carried instructions: "Wear Your Goggles," "Gauges in Acid or Caustic Service Must Be Steamed Out," or "Mercury Vapor is Toxic. Pick Up Spilled Mercury."

It was time now to go to the field for a practical demonstration in instrument control of processes. The Light Ends Fractionating Units, or LEFU, had been chosen for this demonstration.

The instrument board at these mammoth fractionating units stretched from one end of the control room to the other, and was a sight to inspire awe in anyone unfamiliar with refinery processes. Instruments marched in orderly and seemingly endless procession over the long, high panel. Operators, clip boards in hand, walked slowly along in front of the rows of instruments, taking routine readings.

Our visit could not have been timed better. Just as we arrived, the chief process operator was asking the instrument technician in charge to check a temperature controller on Column 2. This particular job meant a trip to the top of the tower, for the temperature was being taken from that point.

The long trip to the top added to the impression of the unit's height. As we climbed steadily upward, we got our first real overall view of the refinery. Heat boiled skyward in great waves. Smoke and steam in some places completely obscured parts of the huge plant. Hundreds of miles of pipes of all sizes and shapes formed intriguing patterns below. From this great height, we could see several tankers taking on cargo at the distant docks.

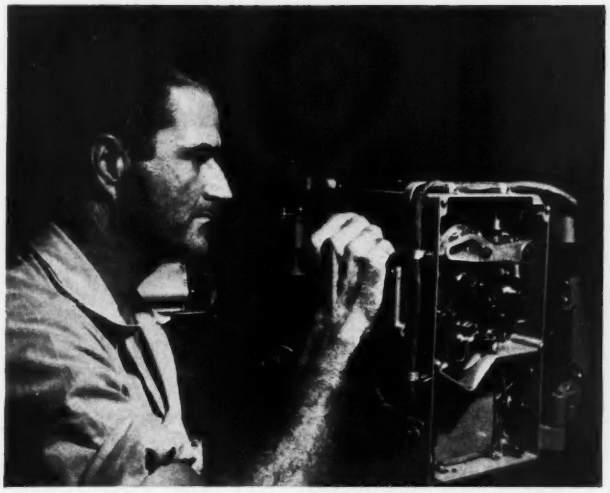
Interest in the refinery below was interrupted as the instrument man began to make his check of the various mechanisms making up the temperature controller. He withdrew from its socket extending inside one of the huge towers a slender temperature bulb filled with vapors which expand upon contact with heat. This bulb transmits temperature readings through a very small vapor-filled line to a receiving instrument in the control house below. To begin the test, the bulb was immersed in a pail of hot water, and the temperature of the water was taken with a test thermometer. The thermometer showed 160 degrees Fahrenheit. Signals from an assistant on the ground revealed that the receiving instrument was reading 161 degrees. A backward adjustment of one degree was made in the receiving instrument.

CONTROL VALVE, type which regulates flow of liquid, gas, or steam through pipes, is hoisted into position to facilitate repair.

INSTRUMENT TECHNICIAN checks primary measuring element of a temperature controller high atop Light Ends Fractioning Units.

STEADY HANDS are necessary to handle the many midget-sized tools which field repairmen use in making adjustments on instruments.

DELICATE ADJUSTMENT is made on finely balanced galvanometer on a temperature controller at Fluid Catalytic Cracking Unit No. 1.



FINAL CHECK is made in shop's pyrometer room before a new electronic recorder-controller is sent out for field service.

GAUGE ROOM at the instrument shop where some 1,500 pressure gauges of all kinds are calibrated or adjusted for accuracy monthly.

Several later checks were made as the water cooled, and the receiver responded accurately. The job was done.

With our feet on firm ground again, our combination technician-guide explained how the instrument controlled temperature. Through a complicated mechanism inside the receiver, movement of the pen recording temperature on the receiver's chart put more or less air pressure above the diaphragm of a control valve such as we had seen in our visit to the shop. This valve was on a steam line. As more or less pressure on the diaphragm controlled the degree to which the valve opened or closed. varying amounts of steam were allowed to enter the tower. If the temperature rises above the desired level, the pen moves upward on the chart to record the increase, and closes the steam valve a little, lowering the temperature to the desired point.

The purpose of the trip to Baytown refinery's instrument department was to determine, and pass on to friends of Humble, the relationship of instrumentation to output of modern refining units. Actually, it did much more than that. On the way over, we had been thinking in terms of machines. We returned thinking in terms of men. The special skills required of those responsible for operating these great units, and of those who must be on hand to keep instruments recording and controlling accurately are tremendously important factors in the successful operation of giant modern refinery units.

Ship captains, in bringing their vessels safely to port, momentarily relinquish their commands to a pilot. At times when work must be done on delicate control instrument equipment, process operators entrust part of their responsibility to the skilled hands and the "know how" of trained instrument men. At such times, that skill and "know how" determine whether the unit will remain productively on stream or be brought down for expensive repairs and replacements.

The refinery's splendid record of keeping lost time at a minimum is largely attributable to the efforts and skill of these trained operators and mechanics.

SIDE BOOM TRACTORS hoist the old line out of the trench and workmen slide skids under it. The cleaning machine in the background removes dirt and scale, and behind it inspectors check the clean pipe carefully to detect sections needing repairs. On an over-the-ditch job like this, repairs are made with the line on skids.

UP FOR Repairs

Normal and accumulated reconditioning demands bring variety of problems to Pipe Line maintenance engineers

"OUT of sight, out of mind" may be a fine old axiom, but it has no place in the lexicon of the pipe line maintenance engineer whose potential troubles begin whenever a section of line is covered up. Vigilance is particularly essential on such a large system as Humble Pipe Line Company's 8,000 miles of main line and gathering network buried in the sand hills of New Mexico and in the plains, mountainsides, river beds, salt marshes and bays of Texas.

During the war years it was a particularly difficult task to keep this system in good repair when it was transporting more oil than any other system in the nation. Major construction work has held priority over general maintenance work, and because only a limited amount of the latter has been possible, the program for 1945 includes not only normal annual work but also some accumulation from past years. This is true because contractors who normally handle pipe line construction and repair work have been faced with manpower and equipment shortages and have been engaged primarily in the construction of extensive War Emergency Pipe Line systems.

Early this year, however, when manpower and equipment became available, the 1945 reconditioning program was planned to include work that has been under consideration for some time but had been postponed. The end of the war in Europe in June eased the load on the pipe line system somewhat, and the war's end in the Pacific cut down considerably the demand for fuel, making it easier than anticipated to carry out the program outlined.

The 1945 reconditioning program, which on October 1 was about two-thirds completed, covers seven percent

HALF-WRAP WELD is made (top) in repairing seriously corroded sections of line. Following repairs, doping and wrapping machine prepares the pipe again before it is relaid in the trench.

of the pipe line system—some 350 miles of trunk line plus lines in tank farms at the older pump stations and lines at the bigger terminals which have undergone severe strain during the war years. All this year's repair work has been on crude oil lines, with the exception of one 27-mile section of natural gasoline line.

Up for repairs are sections of pipe line in all parts of the state, presenting a variety of problems and hazards. The work consists, generally, of: raising old pipe and cleaning, repairing, coating and wrapping it and returning it to its trench; removing collars on old-type threaded and coupled lines and converting them into all-electrically welded lines better to withstand pressure; welding collars to prevent likelihood of leaks; rerouting lines out of urban areas; working over Panhandle river crossings; and replacing entire sections with new pipe. All of this work is being completed with little or no stoppage in the flow of oil through the lines being reconditioned.

The customary method of reconditioning a pipe line is to strip the line by means of a ditching machine; raise the line and place it on skids above the ditch, using side boom tractors. The line is then cleaned with a traveling type cleaning machine, inspected, and repaired where needed. One method of repairing is to fill corrosion pits by means of electrical spot welding. Another method is to weld on patches and half-wrap formed of steel plate to cover the more seriously corroded areas. In cases where the pipe is very badly corroded, sections are sometimes cut out and good pipe installed. This is considered the most effective method of repair, but its use this year has been restricted because of the need to keep the lines in continuous service on account of the urgency in transporting oil.

After the line is repaired, it is given a final cleaning, and a protective coating consisting of a primer, pipe line enamel, and asbestos pipe line felt is applied. The line then is lowered back into the ditch and backfilled. The entire process is carried out without stopping the flow of oil. This is known as the over-the-ditch method of reconditioning.

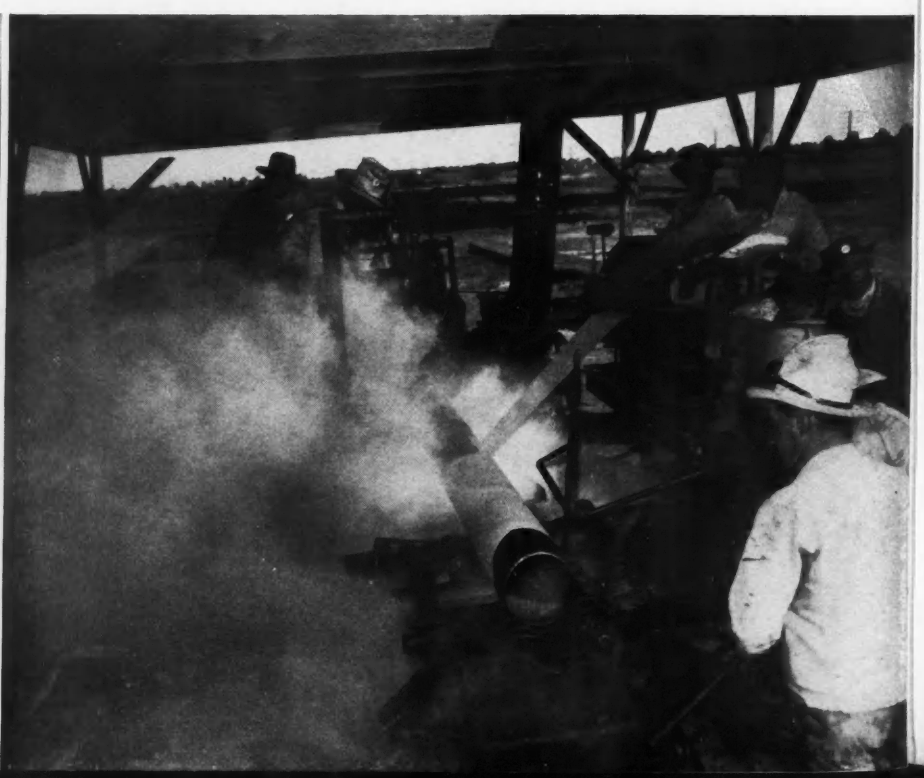
One of the more difficult jobs in this year's program has been taking up a portion of two lines, each eleven miles long, between Agua Dulce and Viola. Still in progress, this job calls for removing the collars on these threaded and coupled lines and making them all electrically welded lines. Ordinarily such an operation presents no extraordinary problem, but the parallel lines pass through an oil field and there are other pipe lines crossing them, making it impossible to use the over-the-ditch machine system of reconditioning usually used in jobs of this type. Consequently, these lines are being repaired, a section at a time, with the pipe transported on trucks to a nearby reconditioning yard for cleaning, repairing, coating and wrapping, and then brought back, welded, laid, and tied into the line, replacing other sections which are taken away for repairs. By this method, the flow of oil is cut off only long enough to make the tie-ins necessary for removing each section.

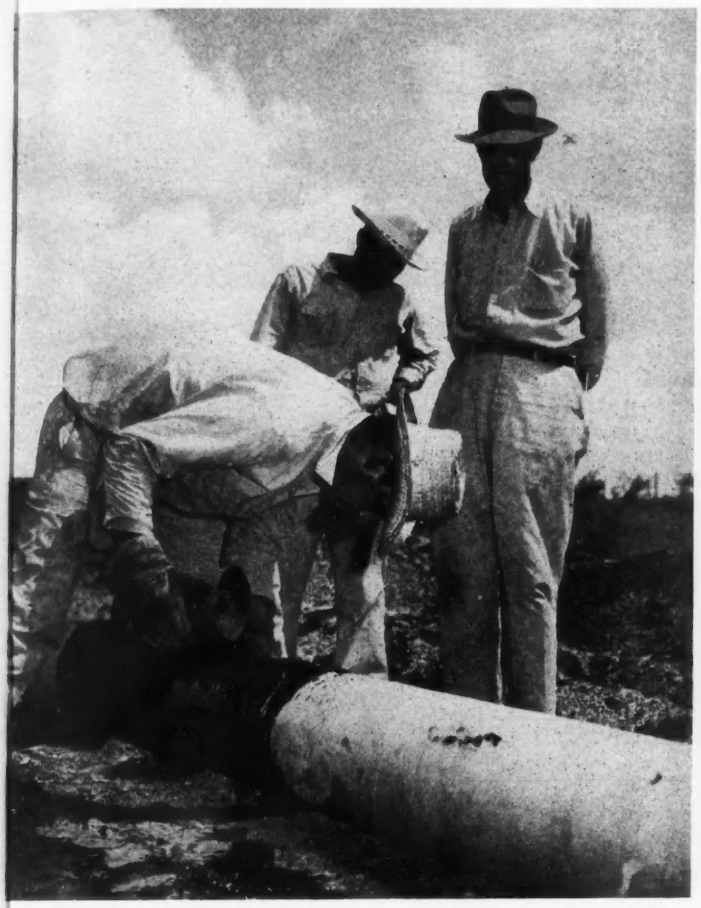
A problem job of the year which tested the ability and ingenuity of the pipe line repairmen was the assignment to replace a mile and a half of line through a salt marsh. This job, which has been completed, was between Viola and Ingleside where the right-of-way is accessible to wheeled vehicles only a few weeks a year because of the Gulf tide and river flood conditions. Six thousand feet of line had to come up and be replaced—all in the latter part of July and the early part of August. The men who did this job are not ones to dispute the statement that "time and tide wait for no man." They fought both elements during the whole operation.

They worked quickly to finish the job before the tide was due to back water into the marsh lands once more; each day they watched the water crawl closer and closer, and moved their equipment back. Then as the job was nearing completion—they thought there was ample time to finish the operation—hurricane warnings were hoisted. The first storm of the season—an early one—was headed for that section, pushing the tide higher. It was then they began working late into the nights, fighting the minutes and the tide all the way, and they won. The line was replaced and machinery moved before the low land became a marsh for another year.

Another job which is listed under the undramatic heading of "general reconditioning for 1945"—but which actually

BURNING OFF collars on old threaded and coupled line preparatory to making it into all-welded line. At pipe rack (right) reconditioned line is doped and wrapped before being relaid.





HAND DOPING and wrapping is done after sections of pipe have been welded at the ditch. Laying repaired line back into the trench in long strings goes on in spite of weather conditions.

was a difficult assignment—was the repair work on portions of a natural gasoline line between Fairfield and Groesbeck. More than 12,000 barrels of vitally needed propane and butane mixture were being pumped through this line daily, and there could be no shutdowns on this flow of a critical product. The factor which made this job unusually difficult was the extremely volatile nature of the natural gasoline in the line. Utmost care must be exercised in handling with safety a line transporting such volatile materials. When leaks occur, only spark proof tools may be used in the vicinity of the leak until it is stopped. Under these difficult conditions, the job was completed on scheduled time.

Another special problem being encountered this year is that of reconditioning the Panhandle river crossings of the Salt Fork of the Red River, the South Pease River, the North Fork of the Wichita River, and the Brazos River. The Salt Fork, the South Pease and the North Fork are wide and shallow, and because quicksand is encountered, wider ditches must be dug and much more than the normal amount of earth must be moved to provide a suitable ditch. Also on these particular river crossings it is necessary to reinforce welds on the pipe because the river sands shift as the river changes its course, bending the pipe and weakening the couplings. Consequently old acetylene welds are reinforced with welding sleeves to give added strength to the joints.

These are only a few examples chosen from the twenty-odd reconditioning jobs which the Pipe Line Company is completing this year. Each job presents its own hazards and problems, but to the men of the Pipe Line Company, it's all a part of the day's work.

The crude oil and natural gasoline transported must be delivered in accordance with definite schedules, and only the least possible interruptions of these schedules are permitted. Keeping a network of pipe line in good repair is comparable to maintaining a railroad system. It requires planning and forethought; it demands that a watchful eye be kept on every foot of thousands of miles of line. Reconditioning must be done before the need becomes urgent; leaks have to be repaired before they become critical — preferably potential trouble spots detected before they actually become leaks. Generally, the need for repair work must be anticipated by weeks, if not months.

That's why pipe line maintenance engineers have little use for the "out of sight, out of mind" axiom, for with them, chances are good that every line which has been out of sight for any length of time may need to come up for repairs.

IN THE SERVICE

☆ ☆ ☆ ☆ ☆

Honors awarded, promotions gained, work well done, furloughs, homecomings—all feature in the news of Humble's service men, many of whom are back experiencing the strangely unfamiliar feel of civilian clothes and many of whom are yet serving in posts around the world.

Headline news comes from Camp Detroit, near Laon, France, where *Second Lieut. Louis V. Sawyer* recently was presented with the Army's third highest award—the Silver Star Medal—for gallantry in action on April 26, 1945. The son of G. A. Sawyer, who is with Humble's Production department at Talco, and Mrs. Sawyer, the lieutenant also is a Humble man. He was with the Production department at Hawkins when he resigned to enter the Army March 2, 1942.

From headquarters of the United States forces in Austria comes a release stating *Major Roger W. Jackson*, who was a Humble petroleum engineer before being called to active duty in August, 1941, was among the first Americans to enter Vienna. He is now operations officer in the Engineer Section of the USFA after seeing combat with the 36th Infantry Division and earning six battle participation stars on his Europe-Africa-Middle East campaign ribbon.

Recently home to tell in person some of his experiences was *Shipfitter First Class H. L. Staples*, who was on a 30-day stateside leave after 25 months in the Pacific with the 82nd Naval Construction Battalion. With the Production department at Bayou Sale at the time of his enlistment in January, 1943, he went into the service on his 14th anniversary with Humble. He wore combat stars for the New Georgia, Treasury-Bougainville and Okinawa campaigns and also saw duty on New Caledonia, in the New Hebrides and on Guadalcanal.

Also back home on leave and a recent visitor to THE HUMBLE WAY office

T/Sgt. James Marion Logan, 23-year-old holder of the Congressional Medal of Honor, the Distinguished Service Cross, Combat Infantryman's Badge, the Purple Heart and other awards for his valor in action and proficiency at arms with the 36th Division, on August 14 became a Production department roustabout for Humble at Friendswood. Known as the one-man Army at Salerno and Velletri, he at one time single-handedly routed and killed possibly 40 of the enemy to secure American advanced positions. Native of Luling, he left an oil field job there to enter the Army when called up for service as a Texas National Guardsman just 52 months before his discharge May 24 of this year. He wanted to get back into oil field work, and he says he chose Humble as the best Company in the business.

JAMES LOGAN

EIGHT HUMBLE employees are members of a petroleum distribution company which recently was recommended for award of a Meritorious Unit Plaque in the European theatre. Standing, left to right: S/Sgt. Ralph R. Weed, Jr., HPL, Houston; S/Sgt. Thomas R. Robbins, HPL, New London; Capt. Octave L. Fontenot, CE, Houston; Lt. Thomas W. Detlefs, HPL, Odessa. Seated, left to right, S/Sgt. Lance Waters, Production, Falfurrias; M/Sgt. Milton Brazier, HPL, Odessa; M/Sgt. Ray G. Miller, HPL, Odessa; and T/Sgt. Edgar Stubblefield, HPL, New London station.

Williams CM2/c

Lt. Sawyer

Staples SF1/c

D. C. White

Pvt. Killingsworth

Capt. Feagan

was CM 2/c *John M. Williams*, who had seen action with the 56th Naval Construction Battalion at Oahu, Hawaii and in the Marianas. He was with the Production department at Kelsey before enlisting in the Seabees in November, 1942.

From the headquarters of the Eighth Service Command in Dallas comes news that *Carl F. Schupp II*, research chemist for Humble before being called to active duty in 1940 as a first lieutenant, has been promoted from the rank of lieutenant colonel to the grade of colonel, making him the youngest colonel in the command and one of the youngest in the Army Service Forces.

With the lifting of censorship concerning the installation of military petroleum pipe lines comes special commendation for the work of *Capt. Lewis A. Feagan* as one of the commanding officers of a group which constructed the military pipe line in Italy. The line was laid through all manner of natural hazards, adverse weather and terrain conditions, sabotage, and enemy fire. Before going into the service he was district gauger at Odessa.

Also news comes from somewhere in the Pacific that *Marine Private First Class Paul Killingsworth*, who was with the Humble Pipe Line Company in Corpus Christi before enlisting in the Marine Corps in June, 1944, is now in a rehabilitation area after seeing action as a tractor operator with an amphibian tractor unit of the Fifth Amphibious Corps.

News comes that another Pipe Line Company man, also in the Pacific, *Coxswain Donald C. White* with the Coast Guard, is presently at an advance base awaiting assignment to a Japan-bound ship. He previously saw service aboard a Coast Guard-manned Army freight supply ship.

PROMOTED TO COLONEL

Seen receiving the silver eagles of a full Army colonel is John M. Schweizer, Jr., assistant manager of the Aviation division of Humble's Sales department when he went into the Air Corps in June 1942, and now acting chief of staff of the Sixth Air Force in Panama. Brig. Gen. Earl H. DeFord, left, commander of the Sixth Air Force, makes the presentation. Colonel Schweizer, before beginning his affiliation with Humble in 1937, was a pilot for American Airlines.

CAPT. KERMIT K. BEAHAN, hero bombardier who dropped the atom bomb on Nagasaki—the bomb which was credited with ending the war—is seen being welcomed home for a short leave in Houston by his father and mother, Mr. and Mrs. A. J. Beahan, and by Leche Sylvester, of the Industrial Relations department at Humble's Baytown refinery. Captain Beahan was a Baytown refinery time office employee when he enlisted in the Air Corps in May, 1941.

He returned to the United States from Tokyo in a non-stop test flight of a group of B-29's from the Japanese capital to Chicago. A veteran of thirty missions over Europe and North Africa and of four crash landings, he had been in the Pacific for six weeks before the Nagasaki bombing. He wears the Distinguished Flying Cross, the Purple Heart, and the Air Medal with clusters.

By the way . .

Three Houston Office employees were among the 64 American scientists and engineers who late in August were awarded the Meritorious Civilian Service Award in recognition of outstanding contributions to the war program. The presentations were made by Rear Adm. F. L. Reichmuth to Dr. Melvin C. Terry, Adelbert Barry and Whitson D. Mounce in special ceremonies at the Washington Navy Yard.

President H. C. Wiess early in August was elected to special five-year membership on the corporation of the Massachusetts Institute of Technology. He succeeds former Secretary of State Edward R. Stettinius, Jr., whose term expires this year.

Retirements

Thomas H. Elliott from Pipe Line Company at Cisco on August 2 . . . Cris S. Kisling from Production department at London on August 2 . . . August W. Mattson from Production department at Friendswood on August 12 . . . Archie O. Turlington from Tyler Sales on August 20 . . . Walter A. Conner from Baytown refinery on August 25 . . . Charles E. Dutton from Pipe Line Company at Agua Dulce on August 27 . . . Charles M. Thomas from Houston Bulk Sales on August 1 . . . Oscar L. Culley from Baytown refinery on August 13 . . . Joseph E. Nelson from Pipe Line Company at Kemper Station September 1 . . . Oscar H. Lundy from Houston Office Sales on September 1 . . . William E. Cook from Production department at Luling on September 3 . . . Kermit Kolmer from Baytown refinery on September 12 . . . and Mrs. Beulah Tamplet Hill from Houston Office on September 24.

Transfers and Promotions

C. H. Keen and S. S. Langford, assistant superintendents of Louisiana and Corpus Christi Production divisions respectively, have exchanged places . . . L. H. Riley, Wink, district superintendent, transferred to Natches district . . . and M. M. Rogers, Wasson district superintendent, transferred to Wink district . . . Homer McCarty, assistant superintendent, Wasson district, made superintendent . . . H. D. Dickson, division civil engineer, Midland, transferred to Houston . . . and W. A. Walston, assistant division engineer, New Orleans, promoted to division engineer at Midland . . . H. E. Meadows promoted to assistant division civil engineer, New Orleans, and O. J. Aucoin to district chief clerk at Bayou Sale . . . T. M. Roper, Bayou Sale chief clerk transferred to Natchez . . . J. R. Nichols transferred from Luling to Conroe as gas plant superintendent, replacing J. A. Lee, resigned . . . M. A. Mills transferred from Katy to Hilbig Gas Repressuring plant . . . I. C. Corbell from Tomball Gas plant superintendent to Flour Bluff plant, exchanging with W. A. Drake, superintendent of Flour Bluff plant . . . R. W. Kuhlman, assistant retail sales manager for past seven years, transferred to Waco as local manager . . . P. J. Whelan, head of Patent department, Houston office, resigned to accept post in Patent department with Standard Oil Company (NJ) . . . and George B. Corless, superintendent of Gulf Coast division, Production department, took special leave on August 15. He is on loan by the Company to Standard Oil Company (NJ).

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Deaths

Annuitants George T. Ready, 60, at Texas City, August 1 . . . Nat H. Sharp, 73, at Shreveport, on August 30 . . . At Todd City on September 9, Daniel C. Schenck, 51 . . . Alley L. Jones, 63, on October 1 in Houston . . . Alonzo O. Spivey, 65, on September 4 . . . Lawrence B. Butvoye, 61, at Baytown September 5. Employees William J. Russell, 55, at Gladewater on August 5 . . . John B. Wendell, at Myrtle Springs, August 2 . . . William T. Chestnutt, 56, at Hull, on August 30 . . . Thomas Sondaval, 52, at Baytown on September 10 . . . Elwood L. Willis, 39, at Baytown, on August 20 . . . Edward P. Kenney, 54, at Baytown, on September 17 . . . Hulin P. Kemp, 45, at Boerne, on October 1 . . . S/Sgt. Alexander C. Roberts, Jr., 32, in plane crash in Germany, on August 12.

MOONLIGHT DRILLING. Scene of the E. L. Milo No. 10 deep test well in the Tomball field.